

Application No. 10/591,622
Reply Dated November 28, 2011
Reply to Office Action Dated September 27, 2011

Remarks

Claims 1-21 are pending.

Claims 1-21 stand rejected.

Claims 1-21 are submitted herein for review.

No new matter has been added.

In the Office Action, the Examiner maintains her rejection of claims 1-21 under 35 U.S.C. §§ 102(e) as being anticipated by Siegel (U.S. Patent No. 7,923,500) as evidenced by the evidentiary reference (ZnO tech sheet -nanophase Technologies). Applicant respectfully disagrees with the Examiner's assertion and submits the following remarks in response.

In response to the prior Amendment filed on September 13, 2011, the Examiner responds that she has relied on the totality of the teachings in Siegel for her determination that the ZnO filler therein is non-linear and that the ZnO filler is 99% pure (citing also to the Nanophase Technologies brochure). Office Action at pgs. 2 and 4-5.

Independent claim 1 is directed to an electric field control material including a polymer matrix in which is dispersed a non-linear filler having non-linear electric resistance properties, where the non-linear filler includes at least 97% by weight of zinc oxide as a homogeneous powder, and less than 3% by weight of at least one metal oxide as traces.

Applicants begin by noting that the present arrangement as claimed includes a non-linear filler (dispersed in a polymer matrix) that includes at least 97% by weight of zinc oxide as a homogeneous powder.

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As noted in paragraph [0015] of the present application, the term "...zinc oxide as a homogeneous powder..." has a specific meaning regarding the structure of the filler itself.

For example, paragraph [0015] of the present application states:

"By a homogeneous powder is meant a structure which in majority consists of distinct grains, or even quasi-exclusively consisting of independent grains, and in which the grain boundaries are present in a very small minority, or even quasi-absent."

Moreover, paragraph [0017] states:

"Unlike its counterpart from the state of the art, zinc oxide is therefore not used here in a doped form, as moreover implicitly confirmed by the extremely reduced proportion of metal oxides in the filler, *as well as the absence of a real intergranular phase in a powder of homogeneous structure.*" (emphasis added)

Thus in the present application, the non-linear filler dispersed in a polymer matrix includes zinc oxide as a homogeneous powder, which refers to the structure of the powder itself. The application later refers to the distribution of the ZnO power (homogenously) in the polymer matrix. See for example, paragraphs [0075] - [0086].

The cited prior art of Siegel (or as evidenced by Nanophase Technologies) does not show this feature. Applicants note that in Siegel, the nano-composite (ZnO) is distributed heterogeneously in a polymer matrix. See abstract and column 10. The cited Siegel reference also discusses the differences between homogenous distribution and heterogeneous distribution of the filler in the polymer matrix. See col. 10, line 53 - col. 11, line 20.

However, in either case, the ZnO of Siegel is not a homogenous powder within the meaning of the present claims. Siegel does discuss the various possible filler particles (including ZnO) on col. 3, lines 29-50, but they do not discuss the feature of the structure of the filler being

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a homogenous powder, nor does the Nanophase Technologies brochure discuss such a structure.

As such, Siegel only teaches ZnO fillers which are mixed in a polymer matrix in some manner, primarily heterogeneously. Siegel however is silent about the fact that a non-linear filler having a homogeneous structure. Therefore, Applicants submit that claim 1 differs from Siegel in that it covers a non-linear filler as homogeneous powder, said powder being dispersed in a polymer matrix, the homogeneity structure of the ZnO powder being a key point for the electrical properties of the material.

In view of the foregoing, Applicant respectfully submits that pending claims 1-21 are in condition for allowance, the earliest possible notice of which is earnestly solicited. If the Examiner feels that an interview would facilitate the prosecution of this Application she is invited to contact the undersigned at the number listed below.

Respectfully submitted,
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